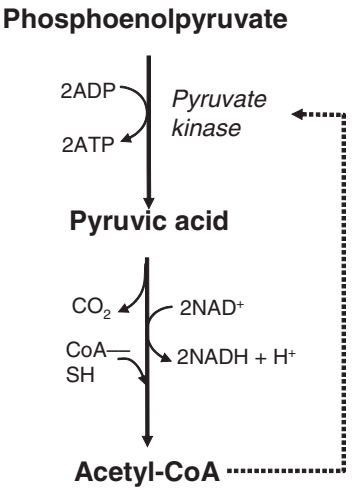

Figure 2.3. Feedback loop in the linkage between glycolysis and the citric acid cycle. In the final reaction of glycolysis, phosphoenolpyruvate produces pyruvic acid. Pyruvic acid then produces acetyl-CoA, some amount of which is needed to continuously replenish the citric acid cycle (not shown). If more acetyl-CoA is produced than can be used in the citric acid cycle, it accumulates and feeds back (dotted arrow) to inhibit pyruvate kinase, the enzyme responsible for the first step in the reaction. This in turn will stop glucose from entering the glycolytic pathway.

with diagrams, the operations of reasoning must be different. To understand how scientists reason with diagrams it is helpful to keep in focus the fact that mechanisms generate the phenomenon in virtue of their component parts performing their operations in a coordinated manner. The kind of reasoning that is needed is reasoning that captures the actual operation of the mechanism, including both the operations the components are performing and the way these operations relate to one another.

One limitation of diagrams when it comes to understanding mechanisms is that they are static. Even if they incorporate arrows to characterize the dynamics of the mechanism, the diagram itself doesn't do anything. Thus, it cannot capture the relation of the operation of the parts to the behavior of the whole mechanism. Accordingly, the connection together must be provided by the cognitive agent. The cognizer must imagine the different operations being performed, thereby turning a static representation into something dynamic.[11]

[11] Animated diagrams relieve people of this difficult task and are often far more instructive to novices. Thomas M. Terry of University of Connecticut has produced some excellent ones that make clear how the many operations in cellular metabolism are related. He has them posted at http://www.sp.ucon.edu/~terry/images/anim/ETS.html. Another good site for such diagrams,